

Application No.: 10/709,945

IRJ

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Michael R. Seal, et al.

Application Number: 10/709,945

Filed: June 8, 2004

For: METHOD AND SYSTEM FOR
SPATIALLY VARIABLE RATE
APPLICATION OF AGRICULTURAL
CHEMICALS BASED ON REMOTELY
SENSED VEGETATION DATA

Attorney Docket No.: 025103.50315

TRANSMITTAL LETTER

Mail Stop: DD
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The following documents for the above-captioned application are enclosed herewith:

1. Information Disclosure Statement;
2. Information Disclosure Citation (form PTO 1449);
3. Return Postcard; and
4. Check No. 2573 in the amount of \$180.00 made payable to Commissioner of Patents and Trademarks

If a fee is due, please debit Deposit Account No. 50-0858. In this regard, a duplicate copy of this Transmittal Letter is enclosed herewith. If you have any questions, please contact me.

Respectfully Submitted,

Butler, Snow, O'Mara, Stevens &
Cannada, PLLC

By:

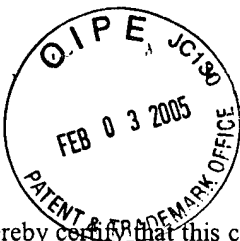
SUSAN B. FENTRESS

Reg. No. 31,327
6075 Poplar Avenue, Suite 500
Memphis, TN 38119
(901) 680-7319

Date

1-28-05

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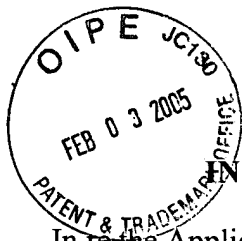


CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage prepaid, on January 28, 2005 in an envelope addressed to: Mail Stop DD, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.



James D. Montgomery



Application No.: 10/709,945

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Attorney Docket No.: 025103.50315

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Mail Stop: DD
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached Form PTO-1449.

Applicants respectfully requests that the Examiner consider the listed documents and indicate that it was considered by making appropriate notations on the attached form.

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that the listed documents are material or constitute "prior art." If the Examiner applies the document as prior art against any claim in the application and Applicant determines that the cited documents do not constitute "prior art" under United States law, Applicants reserve the right to present to the office the relevant facts and law regarding the appropriate status of such documents.

Applicants further reserves the right to take appropriate action to establish the patentability of the disclosed invention over the listed documents, should the documents be applied against the claims of the present application.

Document AA – U.S. Patent Application No.: 2004/0034450 discloses remotely sensed spectral image data are used to develop a Vegetation Index file which represents spatial variations of actual crop vigor throughout a field that is under cultivation. The latter information is processed to place it in a format that can be used by farm personnel to correlate and calibrate it with actually observed crop conditions existing at control points within the field. Based on the results, farm personnel formulate a prescription request, which is forwarded via email or FTP to a central processing site, where the prescription is prepared. The latter is returned via email or FTP to on-side farm personnel, who can load it into a controller on a spray rig that directly applies inputs to the field at a spatially variable rate.

Document BB – U.S. Patent No.: 6,708,080 discloses a control system for an agricultural implement, such as an agricultural sprayer, used to dispense a product to the ground wherein the dispensing units for the product are provided with control valves that can reduce the flow rate of product through selected dispensing units to zero. By controlling the rate of flow through the dispensing units, overlap of the application of the product to the ground can be substantially eliminated. In alternative embodiments of the invention, the control mechanism can receive data from a remote source, such as a central controller or another implement operating in the field, to define where the product needs to be applied to the ground. The application of the product can also be controlled through or in conjunction with a prescription map. Preferably, each dispensing unit is provided with a control valve operably associated with the control system so that each dispensing unit can be independently controlled to provide a variable flow rate of the product to the ground.

Document CC - U.S. Patent No.: 6,683,970 discloses a method of diagnosing nutritious condition of crop in a plant field is disclosed. The method comprises the steps of: locating a camera equipped with a plurality of image elements in a predetermined central depression angle with respect to the plant field; obtaining an amount of reflection light of a crop leaf for each image element by image-taking the field; obtaining an image-taken area for each unit image element by an area function constituted by a conversion variable including a ground clearance, an image element depression angle, the number of image elements and a field angle of the camera; making an area compensation of the amount of reflection light for each image element by the image-taken area; making a depression angle compensation of the amount of reflection

light by a depression angle coefficient predetermined for compensating differences of amounts of reflection light correspondingly with image element depression angles; measuring an amount of light incident on the crop leaf; obtaining reflectance from the amount of the reflection light compensated and the measured amount of incident light; obtaining first crop information in a predetermined area based on the reflectance and a first crop related formula predetermined for obtaining crop information from reflectance, and storing the first crop information; and determining a nutritious condition of the crop in the plant field based on the first crop information. Instead of the grand clearance of the camera, a distance of field of view of the camera may well be used.

Document DD - U.S. Patent No.: 6,678,580 discloses a control system for an agricultural implement, such as an agricultural sprayer, used to dispense a product to the ground wherein the dispensing units for the product are provided with control valves that can reduce the flow rate of product through selected dispensing units to zero. By controlling the rate of flow through the dispensing units, overlap of the application of the product to the ground can be substantially eliminated. In alternative embodiments of the invention, the control mechanism can receive data from a remote source, such as a central controller or another implement operating in the field, to define where the product needs to be applied to the ground. The application of the product can also be controlled through or in conjunction with a prescription map. Preferably, each dispensing unit is provided with a control valve operably associated with the control system so that each dispensing unit can be independently controlled to provide a variable flow rate of the product to the ground.

Document EE - U.S. Patent No.: 6,606,542 discloses a system for creating application maps for controlling a dispensing apparatus based upon field data, the system including a system for maintaining field data. The field data may be georeferenced relative to geographic coordinates of the location of the field data. Application rate equations for correlating field data relative to desired output may be selectively defined based upon selected field data and desired output to produce application maps for a particular field. A processor is designed to selectively access field data for a particular field to execute application rate equations for the field data to produce an application map which may be used for variable rate application of material by dispensing apparatus based upon the selected field data and the desired output.

Document FF – U.S. Patent No.: 6,597,991 discloses a method and system for evaluating the water stress status of growing crops in nearly real time employing remote monitoring of entire crop-growing areas, rather than sampling or spot checks, at sufficiently high resolution to recognize features in the crop-growing area, especially to distinguish between crop foliage and non-foliage features, and requiring minimal additional measurements of environmental parameters in the crop-growing area.

Document GG – U.S. Patent No.: 6,596,996 discloses a spectral reflectance sensor including: a light source for emitting a modulated beam of red light; a light source for emitting a modulated beam of near infrared light; a receiver for receiving reflected light produced by either the red source or the near infrared source; a receiver for receiving incident light from either the red source or the infrared source; a signal conditioner responsive to the modulation such that the signals produced by the receivers in response to reflected and incident light from the source can be discriminated from signals produced by ambient light; and a microprocessor having an input such that the microprocessor can determine the intensities of incident red light, reflected red light; incident near infrared light; and reflected near infrared light. From these intensities, and by knowing the growing days since emergence or planting, the sensor can calculate the mid-growing season nitrogen fertilizer requirements of a plant.

Document HH - U.S. Patent No.: 6,549,851 discloses a system and method for translating plant tissue analysis results into nutritional supplement recommendations. A tissue analysis is performed on plant samples from a treatable area of plants. The tissue analysis results indicate current nutrient levels in the plant. The tissue analysis results are applied as inputs to rule-based logic that selects entries from an expert database. The expert database includes nutritional amendment information including specific products, application rates, and application intervals intended to restore the plant nutrient levels to desired values.

Document II - U.S. Patent No.: 6,529,615 discloses a process for determining the health of crops in a field and for correcting deficiencies in the health of the crops is disclosed. The process includes georeferencing aerial photographs of at least a portion of the field, the aerial photographs having a particular spatial resolution; determining the green plane in the aerial photographs thus taken; preparing a relative greenness map of the field based upon the nitrogen

reference area, the relative greenness map providing crop status information having spatial resolution equivalent to the spatial resolution of the aerial photographs; converting the relative greenness map to a nitrogen recommendation map having spatial resolution equivalent to the spatial resolution of the photographs; and applying nitrogen to the field according to the nitrogen recommendation map, whereby the nitrogen is applied to the field without loss of spatial information. A process for treating crops is also disclosed. The process includes establishing, in a field to be treated, at least one predetermined area of high nitrogen reference; photographing from the air, georeferenced portions of the field, using a particular spatial resolution; differentiating soil and crops, in the photographs thus obtained by segmenting images to select crop pixels; preparing a relative greenness map of the field from green plane based upon the high nitrogen reference area, the relative greenness map providing crop information having spatial resolution equivalent to the particular spatial resolution; and treating the crops in the field in accordance with the relative greenness map.

Document JJ - U.S. Patent No.: 6,522,948 discloses a control system is disclosed for an agricultural implement, such as an agricultural sprayer, used to dispense a product to the ground wherein the dispensing units for the product are provided with control valves that can reduce the flow rate of product through selected dispensing units to zero. By controlling the rate of flow through the dispensing units, overlap of the application of the product to the ground can be substantially eliminated. In alternative embodiments of the invention, the control mechanism can receive data from a remote source, such as a central controller or another implement operating in the field, to define where the product needs to be applied to the ground. The application of the product can also be controlled through or in conjunction with a prescription map. Preferably, each dispensing unit is provided with a control valve operably associated with the control system so that each dispensing unit can be independently controlled to provide a variable flow rate of the product to the ground.

Document KK – U.S. Patent No.: 6,466,321 discloses from the crop of a predetermined area in a plant field under exposure to natural light, a reflectivity of the light having relation to crop information such as nitrogen content rate is measured by a camera; the crop information as first crop information is obtained from the first crop related formula established in advance for obtaining the crop information from the reflectivity; light is irradiated on crop leaf blades in the

same area as the predetermined area and an amount of the light is measured; the crop information as second crop information is obtained from the second crop related formula established in advance for obtaining the crop information from the amount of the light; differences are calculated from the first crop information and the second crop information; the first crop information is obtained from the unknown crop in the predetermined area within the crop field of the same area; the first crop information is corrected based on the differences; and the nutritious diagnosis of the crop in the field is conducted by the corrected first crop information. In conducting diagnosis of crop by measuring the reflection light amount from the crop, since compensation or correction is performed, no great errors occur caused by differences in the measurement locations and the planting densities, and the diagnosis of the crop is simple and easy and, more over, the precision in the measuring is enhanced.

Document LL - U.S. Patent No.: 6,366,681 discloses an analysis of multi-spectral data for extraction of chlorophyll content. Multi-spectral data is obtained from an imaging device. The multi-spectral data contains spectral response data for chlorophyll and background data. The background data is removed from the multi-spectral data to isolate the spectral response due only to chlorophyll. This is then presented as a chlorophyll absorption feature which may be analyzed by measuring the width of the feature, the surface area of the feature, or measuring various angular changes of the feature. These measurements may then be used for a variety of purposes including plant health analysis.

Document MM – U.S. Patent No.: 6,336,066 discloses a process for using localized agricultural data to optimize the cultivation of perennial plants, the process including: passage through a parcel of perennial plants by a farm machine; automatic production of positioning signals at several points in the parcel, by means of an absolute positioning sensor, for example, of the differential GPS type installed on board the farm machine; automatic measurement by means of appropriate sensors of one or more pieces of agricultural data at each of these points; recording of the positioning signals and the data measured at these points by a data processing unit; processing of the positioning signals by means of a computer and an appropriate algorithm so as to organize them according to the rows of the parcel, so that the same row can be found again unambiguously during different passes; real-time or deferred representation of the positions passed through and/or the agricultural data in the form of a computer-generated map.

Document NN – U.S. Patent No.: 6,266,432 discloses a method and system for applying substance formulations to a land area is disclosed. A flexible, easily modifiable graphical representation of subareas of the area is provided, wherein to each subarea it is desired to apply a combination of one or more substance formulations uniformly throughout the subarea. A user (e.g., a farmer) needs only to specify a boundary for each subarea on a graphical image of the land area for computationally defining the subarea. Subsequently, since the land area image and the subarea boundaries thereon are geographically referenced to latitude and longitude coordinates, when applying such formulations to the land area, the present invention utilizes global positioning system (GPS) signals to thereby determine when such a subarea boundary has been traversed so that a corresponding change in the applied formulation(s) can be performed.

Document OO – U.S. Patent No.: 6,236,907 discloses a system for creating application maps for controlling a dispensing apparatus based upon field data, the system including a system for maintaining field data. The field data may be georeferenced relative to geographic coordinates of the location of the field data. Application rate equations for correlating field data relative to desired output may be selectively defined based upon selected field data and desired output to produce application maps for a particular field. A processor is designed to selectively access field data for a particular field to execute application rate equations for the field data to produce an application map which may be used for variable rate application of material by dispensing apparatus based upon the selected field data and the desired output.

Document PP – U.S. Patent No.: 6,199,000 discloses Real time kinematic (RTK) global positioning system (GPS) technology is integrated with precision farming methodologies to provide highly accurate seeding, cultivating, planting and/or harvesting operations. RTK GPS systems are used to control fully or semi-autonomous vehicles in these operations and may allow for precision planting of seeds (e.g., from a seeder equipped with an RTK GPS receiver and related equipment) and/or precision weed removal (e.g., using a vehicle fitted with weed eradication mechanisms such as augers and/or herbicide sprayers). Crop specific fertilizer/pesticide application is also enabled through the use of centimeter-level accurate positioning techniques.

Document QQ – U.S. Patent No.: 6,178,253 discloses a process for determining the

health of crops in a field and treating the crops in accordance with that determination. The process first establishes, in a field in which the health of the crops is to be determined, at least one predetermined reference area of crops having a determined nutrient, e.g. nitrogen, content. Then, georeferenced aerial photographs are taken of at least a portion of the field. From the photographs, the green plane is determined. From the green plane, a relative greenness map of the field based upon the nitrogen reference area is prepared. The greenness map may be transmitted to a farm vehicle on the field and thereafter, the field may be selectively treated in accordance with the nutrient deficiencies detected and recorded on the greenness map.

Document RR - U.S. Patent No.: 6,160,902 discloses a multi-spectral imaging system and method for producing an image is disclosed. More specifically, the imaging system produces an image of vegetation for analysis of crop characteristics, such as nitrogen levels, from an area having vegetation and a non-vegetation background. A light sensing unit detects light reflected at multiple wavelengths. The image is segmented into images at different wavelengths such as at the red, green and near infrared wavelengths. The images are combined into a multi-spectral image and segmented into a vegetation image by eliminating all non-vegetation images by using the images at two wavelengths. The vegetation image is analyzed for nitrogen levels by calculating reflectance values at the green wavelength. The images may be stored for further analysis of crop characteristics.

Document SS – U.S. Patent No.: 6,141,614 discloses a computer-aided farming system having a first control system which receives data defining a plurality of parameters. The first control system responsively determines a plurality of nodes located at an agricultural field, and determines a condition status associated with each node. The system also has a second control system located on an agricultural machine which receives data defining the nodes and the condition status at each node. The second control system then plans a path as a function of the nodes, and determines a desired work operation relative to each node. A machine controller controls the agricultural machine to perform the desired work operation at each node.

Document TT – U.S. Patent No.: 6,108,590 discloses a system for optimizing the operation of a plurality of irrigation systems includes at least one control computer, a storage device coupled to the control computer for storing data, a plurality of irrigation device

controllers remotely coupled to each of the control computers, and a grid power monitor coupled to the computers for providing power grid demand and usage data. The system may also include GPS and GIS receivers to determine remotely position and soil condition and/or a plurality of sensors located in each of the irrigated fields which transmit soil information directly to the control computers. The control computers each in turn generate priorities of operation for the irrigation systems based on the soil condition information and most economical load operating periods from the electrical power utility. The system is optimized by generating position data for each of the irrigation systems, generating soil condition data at the position of the irrigation system, including current and/or historical weather data and crop information either manually inputted or determined from remote sensors or satellites, and calculating a required period and priority of each irrigation system operation based on the soil conditions at the location of each of the irrigation systems, the historical and/or predicted weather data, the crop data, and finally, automatically scheduling the irrigation system operations based on input from the electrical utility command computer as to the most economical time period for operation.

Document UU - U.S. Patent No.: 5,995,895 discloses a control system for controlling a vehicle system at least partly in response to an anticipated condition along the vehicle's course of travel is disclosed herein. The vehicle includes a drive train powered by an engine, and the anticipated condition may affect engine load. The control system includes a location signal generation circuit for receiving positioning signals and generating location signals therefrom, a memory circuit for storing a predetermined geo-referenced map including map data indicative of anticipated conditions along the course of travel which may affect engine load, and a control circuit. The control circuit predicts the anticipated condition using at least the location signals and the map data, generates a control signal based at least upon the anticipated condition, and applies the control signal to the vehicle system. The prediction of the anticipated condition can be calibrated using results of a comparison between a sensed actual condition and an earlier-predicted anticipated condition. Anticipated conditions include anticipated slopes, crop conditions and soil conditions. Crop conditions can be anticipated using aerial photography. The controlled vehicle systems include speed actuators, transmissions, crop processors, energy exchangers, clutches and differential locks.

Document VV - U.S. Patent No.: 5,938,709 discloses a field mapping system for an

agricultural vehicle such as a combine, planter or cultivator is disclosed herein. The system includes a circuit for determining the position of the vehicle relative to a field, and a sensor for sensing a characteristic (e.g., grain moisture content, grain harvest yield, soil compaction, altitude, etc.) at locations of the vehicle within the field. The system also includes an electronic display controlled by a control circuit coupled to the position determining circuit and the sensor. The control circuit produces display signals applied to the electronic display to generate a map of an area of the field at a desired scale which includes indicia of the current vehicle location and of the characteristic data being gathered. The map is dynamically redrawn at the desired scale to keep the visual indicia displayed when the vehicle has moved such that the vehicle location no longer corresponds to the displayed area.

Document WW - U.S. Patent No.: 5,919,242 discloses a prescription farming control system includes a navigation controller and a product delivery controller for controlling the rate of operation of a number of agricultural product delivery mechanisms mounted on an applicator vehicle as a function of the global position of the vehicle in an agricultural field. Information is stored in computer memory on board the vehicle to define a number of layers corresponding to each of the delivery mechanisms, each layer including a number of zones representing different levels of activity of the corresponding mechanism. Each zone is defined by a plurality of vertices, rather than on a pixel-by-pixel basis. The navigation controller receives satellite positioning data to combine with pseudorange correction data received from a fixed ground station to determine a corrected accurate global position of the vehicle. A graphics coprocessor includes active invisible graphics memory page onto which each layer is sequentially drawn and interrogated. One user selected layer can be stored on an inactive visible graphics memory page for visual display and then page flipped to the active page for subsequent interrogation. The pixel on each layer associated with the current global position of the vehicle is interrogated to determine the proper level of activity of the delivery mechanism at that location. The product delivery controller includes features to prevent re-application of a product on portions of the agricultural field over which the vehicle has already traveled.

Document XX - U.S. Patent No.: 5,913,915 discloses an improved mobile agricultural products application system including a multi-variable rate dispensing system particularly adaptable for use in site-specific farming, wherein selected discrete crop input delivery

information unique to selected on-board crop input storage devices, and/or crop input transport systems, and/or crop input dispensing points is combined with anticipated field reference point data obtained with a machine positioning system, e.g. "Dead Reckoning", GPS, and/or radar, and a computer, to direct independent functioning of selected on-board storage devices, material transport systems, crop input release mechanisms and/or dispensing point mechanisms to ensure stored crop inputs are released and combined to vary a prescription of delivered crop inputs in a direction substantially transverse to the direction of machine travel as the crop input applicator machine(s) travels over a predetermined geographic land area. The improved system can selectively and exclusively accommodate precise application of seeds, or can optionally accommodate seed application in combination with other crop inputs. The multi-variable rate dispensing system provides environmental advantages to all through enhanced resource management by more accurately and precisely placing crop inputs resulting in a significant reduction in wasted resources.

Document YY - U.S. Patent No.: 5,878,371 discloses a site-specific farming system which performs various functions while remaining relatively unaffected by spurious farming data is disclosed. The farming data may be received in real-time from location signal generation and sensing circuits, or may be received from a digital memory which stores the farming data. The farming data includes both valid and spurious farming data which are identified by integrity checking the data. Existing relationships which exist within the valid farming data are exploited to generate synthesized farming data used to replace the spurious farming data. The valid and synthesized farming data are used to perform a function of the farming system such as performing a statistical analysis of the farming data, generating an electronic display of the farming data, generating a prescription map, or generating variable rate application signals.

Document ZZ - U.S. Patent No.: 5,704,546 discloses a flow rate and droplet size control system for a spray system including a spray liquid source, a pump, a spray liquid line and a nozzle assembly. The control system includes a setpoint conversion subroutine for independently controlling the flow rate and volume median droplet size setpoints. The control system also includes performance envelopes for various nozzle tips. An independent flow rate and droplet size control method is provided for use with the control system. A position-responsive control system receives information pertaining to the boundaries of spray zones and

spray conditions, such as application rates and volume median droplet diameters associated with the spray zones. The position-responsive control system monitors the position of a spray vehicle, which can comprise a ground vehicle or an aircraft. The position-based control system changes the spray system operating conditions in response to the sprayer vehicle position. A position-based method of controlling the spray system utilizes the position-based control system.

Document AB - U.S. Patent No.: 5,689,418 discloses an agricultural communications network including a master system which polls lower level systems for digital maps, each map comprising field character information indicative of a feature at each location of a farmer's field. An agronomist can correlate the data of the digital maps to ascertain common conditions which realize maximum yields. Farmers and their regional dealers participate in the system through subscription. Anonymity is maintained through hierarchy such that the farmers will participate in the network, thus expanding the data base for use by the agronomist. Thus, the participating subscribers facilitate expansion of the field of agronomy for the benefit of all.

Document AC - U.S. Patent No.: 5,467,271 discloses a mapping and analysis system generates agricultural maps and analyzes the agricultural maps to match farm inputs of a farming field to current soil and vegetation characteristics to optimize the productivity of the farming field. The mapping and analysis system includes an air-based device for generating spectral image data related to at least one of vegetation stress and soil characteristics for a portion of the farming field. A position device generates position data related to the position of said air-based device with respect to said portion of the farming field. A georeferencing device synchronizes said position data with said spectral image data to generate georeferenced spectral image data. A database is generated using the georeferenced data to monitor and analyze the farming field for a growing season to improve productivity thereof.

Document AD - U.S. Patent No.: 5,334,987 discloses an aircraft control system for applying chemicals to an agricultural field in one of a plurality of flight patterns is provided. A global positioning system receiver receives radio frequency signals from satellites and the position of the aircraft is determined from the information contained in the received signals. An aircraft computer stores the surface coordinates of the field to be sprayed. The aircraft pilot enters the desired orientation, swath width and track width of the flight pattern into the computer.

Based on the aforementioned information, the computer produces a flight pattern having the desired orientation and generates, via a pilot headset, audible signals representative of amount and direction of deviation from the desired flight pattern. The computer means may also automatically activate and deactivate chemical spraying upon entering and exiting, respectfully, the airspace above the field.

Document AE - U.S. Patent No.: 5,220,876 discloses a variable rate fertilizer spreading apparatus for spreading a precise amount of multiple types of fertilizers upon a field based upon a location in the field. The system comprises a controller accessing a soil map indicating the type of soil for each portion of the field, several fertilizer maps storing the desired fertilizer level of each of the fertilizers stored in product bins on the tractor, and several status maps each indicating the current fertilizer level at various locations of the field to be fertilized. By accessing the speed of the tractor via a speed indicator, and ascertaining the location of the tractor in the field via a position locator, such as an LORAN or GPS system, an expert system determines the dispensing rate of each of the fertilizers based on the various maps and the position and speed indicators such that the proper dispense rate of the fertilizers from bins is set to attain the desired level of fertilizers. The expert system accesses standard and proprietary data tables and processes complex calculations taking into account the interaction effects of multiple fertilizers being dispensed upon a particular type of soil, as ascertained from the soil map. Thus, each portion of a field can be characterized and fertilized such that the resulting level of each of the fertilizers matches the fertilizer maps after spreading fertilizer, where no predetermined path of vehicle is necessary. The current fertilizer level map is updated after a dispensing pass to provide a real-time record.

Document AF - U.S. Patent No.: RE37,574 discloses a harvester which has a global-positioning system is used to harvest crops. Fields to be harvested are divided into individual field areas for crop quality assessment selected by the farmer. Values representing the location of the selected individual field areas or crop management areas are loaded into storage on a computer or recorded. The harvester also includes a dispenser of crop markers. Each crop marker has a unique identifier when compared to the other crop markers used during the harvest. The global-positioning system determines actual field location during the harvest and when an actual field location is close or matches one of the selected field locations, a trigger signal is sent

to the dispenser and a crop marker is inserted into the harvested crop stream. A table of selected field locations and the crop markers inserted into the crop stream from that field location is stored. Later on in processing, the crop marker is detected and a sample of the crop is taken from around the crop marker. A similar system is used for orchard crops. A picker harvests the fruit off a tree and when the task is complete, the picker places some of the fruit from the tree in a bag which is tied shut. A marker such as a bar code label is placed on the bag and a quality test is performed on the fruit in the bag.

In the event the Examiner has any questions regarding this document, please contact the undersigned at the telephone number listed below.

Respectfully Submitted,

Butler, Snow, O'Mara, Stevens &
Cannada, PLLC

1-28-05
Date

By: Susan B Fentress
SUSAN B. FENTRESS
Reg. No. 31,327
6075 Poplar Avenue, Suite 500
Memphis, TN 38119
(901) 680-7319

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage prepaid, on 1/28/2005 in an envelope addressed to: Mail Stop: DD, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

J. Montgomery
JIM MONTGOMERY

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>				ATTY DOCKET NO.		APPLICATION NO.		
				025103.50315		10/709,945		
				APPLICANT(S)				
				Michael R. Seal, et al				
				FILING DATE		GROUP ART UNIT		
				June 8, 2004				
U.S. PATENT DOCUMENTS								
*EXAMINER INITIAL & LAST NAME		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
AA		2004/0034450	02/19/04	Seal, et al.	700/283		08/19/02	
BB		6,708,080	03/16/04	Robert Benneweis	700/242	700/241	03/22/02	
CC		6,683,970	01/27/04	Satake, et al.	382/110	702/2	08/09/00	
DD		6,678,580	01/13/04	Robert Benneweis	700/237	700/244	03/22/02	
EE		6,606,542	08/12/03	Hauwiller, et al.	700/283	111/200	03/22/01	
U.S. PATENT APPLICATION PUBLICATIONS								
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
FOREIGN PATENT DOCUMENTS								
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO
OTHER DOCUMENTS <i>(Including Author, Title, Date, Pertinent Pages, Etc.)</i>								
EXAMINER				DATE CONSIDERED				

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>	ATTY DOCKET NO. 025103.50315	APPLICATION NO. 10/709,945
	Michael R. Seal, et al	
	FILING June 8, 2004	GROUP ART

U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	FF	6,597,991	07/22/03	Meron, et al.	702/3	382/110	03/28/01
	GG	6,596,996	07/22/03	Stone, et al.	250/341.8	250/341.1	07/24/01
	HH	6,549,851	04/15/03	Thomas Greensides	702/2		03/23/01
	II	6,529,615	03/04/03	Hendrickson, et al.	382/110	382/191	12/01/00
	JJ	6,522,948	02/18/03	Robert Benneweis	700/243	700/244	08/14/00

U.S. PATENT APPLICATION PUBLICATIONS							
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

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		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO

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INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>	ATTY DOCKET NO. 025103.50315	APPLICATION NO. 10/709,945
	Michael R. Seal, et al	
	FILING June 8, 2004	GROUP ART

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
KK	6,466,321	10/15/02	Satake, et al.	356/402	356/416	06/16/00
LL	6,366,681	04/02/02	Kevin Hutchins	382/110	382/191	04/07/99
MM	6,336,066	01/01/02	Pellenc, et al.	701/50	25/26	09/21/99
NN	6,266,432	07/24/01	Daniel Wiens	382/113	382/282	02/15/00
OO	6,236,907	05/22/01	Hauwiller, et al.	700/283	701/50	12/30/96

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*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	PP	6,199,000	03/06/01	Keller, et al.	701/50	701/213	07/15/98
	QQ	6,178,253	01/23/01	Hendrickson, et al.	382/110	348/144	08/05/98
	RR	6,160,902	12/12/00	Dickson, et al.	382/110	382/164	10/10/97
	SS	6,141,614	10/31/00	Janzen, et al.	701/50	701/208	07/16/98
	TT	6,108,590	08/22/00	David Hergert	700/284	700/14	01/30/98

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	FILING June 8, 2004	GROUP ART

U.S. PATENT DOCUMENTS

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	UU	5,995,895	11/30/99	Watt, et al.	701/50	701/93	07/15/97
	VV	5,938,709	08/17/99	Hale, et al.	701/50	701/215	11/22/96
	WW	5,919,242	07/06/99	Greatline, et al.	701/50		05/14/92
	XX	5,913,915	06/22/99	Alvin McWuinn	701/50	701/213	09/30/97
	YY	5,878,371	03/02/99	Hale, et al.	702/5		11/22/96

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INFORMATION DISCLOSURE CITATION <i>(Use several sheets if necessary)</i>	Docket Number (Optional) 025103.50315	Application Number 10/709,945
	Applicant(s) Michael R. Seal, et al.	
	Filing Date June 8, 2004	Group Art Unit

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	ZZ	5,704,546	01/06/98	Henderson, et al.	239/1	239/69	09/15/95
	AB	5,689,418	11/18/97	Robert Monson	364/420	382/100	01/03/95
	AC	5,467,271	11/14/95	Abel, et al.	364/420		12/17/93
	AD	5,334,987	08/02/94	Ted Teach	342/357		04/01/93
	AE	5,220,876	06/22/93	Monson, et al.	111/130	111/903	06/22/92

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	Applicant(s) Michael R. Seal, et al.			
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	AF	RE37,574	03/05/02	Stephen Rawlins	702/2		06/09/99

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